WHAT IS CLAIMED IS:

1   1.   A monitoring device operating on a fiber optic

2   network, the monitoring device comprising:

3   an input port for receiving a wavelength division

4   multiplexed optical signal including a plurality of

5   optical signals centered at different wavelengths within

6   a range of wavelengths;

7   a dispersion device disposed to disperse the

8   wavelength division multiplexed optical signal into a

9   discrete power spectrum;

10   a pixelated optical detector having a point

11 spread function and optically coupled to receive and

12 convert the discrete power spectrum into electrical

13 signals; and

14   at least one computing device receiving digital

15 data representative of the electrical signals, performing

16 a deconvolution operation on the digital data to

17 compensate for the point spread function of the pixelated

18 detector, and generating compensated output data

19 representative of the optical signals.

1   2.   The monitoring device according to claim 1,

2   wherein said at least one computing device further

3   transforms the digital data to the frequency domain.

1   3.   The monitoring device according to claim 2,

2   wherein the transformation includes performing a fast

3   Fourier transform (FFT).

1   4.   The monitoring device according to claim 2,

2   wherein said at least one computing device utilizes a

3   filter representative of the point spread function of said

4   pixelated optical detector.

1   5.   The monitoring device according to claim 4,

2   wherein the filter is utilized during the deconvolution

3   operation.

1   6.   The monitoring device according to claim 1,

2   wherein said at least one computing device further

3   transforms the compensated output domain to the spatial

4   domain.

1   7.   The monitoring device according to claim 1,

2   further comprising at least one of the following:

3   a display coupled to said at least one computing

4   device for displaying the compensated output data,

5   a communication device coupled to said at least

6   one computing device for transmitting the compensated

7   output data.

1   8.   The monitoring device according to claim 1,

2   wherein the wavelength range of the wavelength divisional

3   multiple optical signal includes at least one of the

4   following:

5   the optical L-band,

6   the optical C-band, and

7   the optical S-band.

1   9. A method for improving a signal-to-noise ratio

2   measurement range of a monitoring device operating on a

3   fiber optic network, the method comprising:

4   receiving a wavelength division multiplexed

5   optical signal including a plurality of optical signals

6   centered at different wavelengths within a range of

7   wavelengths;

8   dispersing the wavelength division multiplexed

9   optical signal into a discrete power spectrum;

10   measuring the discrete power spectrum by a

11   pixelated optical detector, the measured optical signals

12   including a point spread function response of the

13   pixelated optical detector;

14   generating data representing the measured optical

15   signals;

16   performing a deconvolution operation on the

17   generated data to compensate for the point spread function

18   of the pixelated optical detector; and

19   generating compensated output data representative

20   of the optical signals.

1   10. The method according to claim 9, further

2 comprising:

3   transforming the generated data to the frequency

4 domain prior to performing the deconvolution operation.

1   11. The method according to claim 10, wherein said

2 transforming includes performing a fast Fourier transform

3 (FFT) on the generated data.

1   12. The method according to claim 9, further

2 comprising:

3   measuring a known calibration optical signal by

4 the pixelated optical detector; and

5   generating a filter based upon the measured known

6 calibration optical signal, wherein performing the

7 deconvolution operation utilizes the filter to compensate

8 for the point spread function of the pixelated optical

9 detector.

1   13. The method according to claim 12, wherein the

2   known calibration optical signal has a substantially

3   Gaussian beam profile.

1   14. The method according to claim 12, wherein the

2   filter is utilized during the deconvolution operation in

3   the frequency domain.

1   15. The method according to claim 9, further

2   comprising:

3   determining a current operating temperature of

4   the pixelated optical detector; and

5   loading a filter generated at an operating

6   temperature closest to the current operating temperature.

1   16. The method according to claim 9, wherein the

2   deconvolution operation further includes filtering the

3   generated data to compute the compensated output data in

4   the frequency domain.

1   17. The method according to claim 16, further

2   comprising transforming the compensated output data to the

3   spatial domain.

1   18. The method according to claim 17, wherein the

2   transforming includes performing an inverse fast Fourier

3   transform (IFFT).

1   19. The method according to claim 9, further

2   comprising displaying the compensated output data

3   representative of the discrete power spectrum.

1 20. The method according to claim 9, wherein the

2 wavelength range includes at least one of the following:

3   the optical L-band,

4   the optical C-band, and

5   the optical S-band.

1   21. A method for calibrating an optical performance

2   monitor having a pixelated optical detector for improving

3   an optical signal-to-noise ratio measurement range of the

4   optical performance monitor, the method comprising:

5   measuring a known calibration optical signal

6   applied to the pixelated optical detector;

7   generating data representative of the measured

8   known calibration optical signal;

9   transforming the generated data into the

10   frequency domain;

11   loading data representative of expected data of

12   the known calibration optical signal in the frequency

13   domain; and

14   generating a filter in the frequency domain based

15   on the generated and expected data, the filter being

16   utilized to improve the signal-to-noise ratio measurement

17   range of the optical performance monitor.

1   22. The method according to claim 21, further

2   comprising storing the filter.

1   23. The method according to claim 21, wherein the

2   known calibration optical signal has a substantially

3   Gaussian beam profile.

1   24. The method according to claim 21, wherein the

2   known calibration optical signal is a plurality of

3   calibration optical signals, each calibration optical

4   signal being measured simultaneously.

1   25. The method according to claim 21, further

2   comprising:

3   adjusting an operating temperature of the

4   pixelated optical detector of the optical performance

5   monitor prior to measuring the known optical signal; and

6   storing the generated filter using the generated

7   data at the adjusted operating temperature.

1   26. A computer-readable medium having stored thereon

2   sequences of instructions, the sequences of instructions

3   including instructions, when executed by a processor of an

4   optical performance monitor, causes the processor to:

5   load filter data representative of differences

6   between a known calibration optical signal and an expected

7   measurement of the known calibration optical signal;

8   receive measured data representative of at least

9   one optical signal from a pixelated optical detector;

10   deconvolve the measured data utilizing the loaded

11   filter data to produce corrected data; and

12   output the corrected data.

1   27. The computer-readable medium according to claim

2   26, wherein the known calibration optical signal has a

3   substantially Gaussian beam profile.

1   28. The computer-readable medium according to claim

2   26, wherein the instructions to deconvolve include

3   dividing the measured data with the filter data in the

4   frequency domain.